ATTACHMENT 4

USTA COMMENTS
CC DOCKET NO. 94-1, 96-262
JANUARY 7, 2000

UNITED STATES
TELEPHONE
ASSOCIATION

September 10, 1999

Magalie Roman Salas
Secretary
Federal Communications Commission
445 12th Street, SW
TW-A325
Washington, DC 20554

Re: Written Ex Parte Presentation
CC Docket No. 94-1

Dear Ms. Salas:

Attached hereto is the latest update of the Commission's model used to determine the X-Factor for purposes of price cap regulation. The 1998 update, prepared for USTA by Professor Frank Gollop, utilizes the industry data shown in Attachment B. It simply replicates, without endorsement, the FCC model. The results demonstrate that the X-Factor for 1998 is 3.03 percent. The X-Factor average for the most recent five year period is 4.06 percent and the X-Factor average for the entire price cap era for which data are available, 1991-1998, is 4.12 percent. The update reveals that there is no evidence supporting the claim that the post-1995 X-Factors are biased downward because of the treatment of LEC earnings in the FCC's model.

Pursuant to Commission Rule 1.1206(b)(2), an original and one copy of this letter and attachment are being provided to you for inclusion in the public record for the above-referenced proceeding. Please contact me with any questions.

Respectfully submitted,

Linda L. Kent

Linda L. Kent
Associate General Counsel

Attachment
cc: Larry Strickling
Jane Jackson
Yog Varma
Richard Lerner
Aaron Goldschmidt
Jay Atkinson

The FCC X-Factor:

1996-1998 Update

Prepared for USTA by

Frank M. Gollop

Professor of Economics

Boston College

August 20, 1999

EXECUTIVE SUMMARY

- The X-Factor for 1998 is 3.03. This latest update of the FCC's X-Factor model reinforces the lack of empirical support for the Commission's present 6.5% policy standard.

- The X-Factor average for the most recent five years is 4.06%. The X-Factor averages 4.12% over the entire 1991-98 price-cap era.

Year	X-Factor
1994	5.47
1995	6.20
1996	1.98
1997	3.62
1998	**3.03**
1991-98	4.12
1994-98	**4.06**

- X-Factors for 1996, 1997, and 1998 quantitatively refute what the Commission determined would be an increasing upward trend after the 1993-95 period. The average X-Factor in the 1996-98 period is 2.88, less than half the current 6.5 policy standard.

- Revisions posted recently by the Bureau of Labor Statistics to its TFP and input price data for the U.S. nonfarm sector have caused modest downward revisions in the 1995 through 1997 X-Factors previously reported in the April 14, 1999 X-Factor ex parte.

- The continuing trend reversal in labor input is a dominant source of the lower X-Factors after 1995. USTA's Reply Comments dated November 9, 1998 pointed out that the productivity gains resulting from sizable labor force reductions in the early price-cap years could not be sustained in the long run. Industry headcount has remained flat for the recent two years in contrast to the consistent labor force reductions at five percent annual rates in the 1991-95 period.

- The corollary to the labor input reversal also holds. As labor force reductions ended, the LECs experienced upward pressure in their labor compensation rates. While labor compensation per employee increased at a 3.3% annual rate between 1991 and 1995, it increased at a 4.6% rate in the 1995-98 period. The incremental 1.3 percentage points provide additional downward force on the post-1995 X-Factors.

- The update reveals that there is no evidence supporting the IXC claim that the post-1995 X-Factors are biased downward because of the treatment of LEC earnings in the FCC model. Over the 1995-98 period, the annual rates of input price change averaged 2.6%, 4.6%, and 3.8% for material, labor, and capital inputs, respectively. The trend in capital's input price is not unlike that for the other LEC inputs.

1. Spreadsheet Model

The 1998 update, like its two predecessors, replicates the FCC X-Factor model described in Appendix D of the Commission's May 1997 order. No changes are made to the definition of any of the variables in the model nor are any spreadsheet commands altered. The FCC model, without endorsement, is simply replicated. A complete set of charts, presented in exactly the same sequence and format found in the original FCC order, is attached to this document as Appendix A.

2. Industry Data

Appendix D of the Commission's May 1997 order identifies the data required by the FCC's X-Factor model as well as the forms and reports from which the data are to be extracted. A complete listing of the industry data provided by USTA for 1998 is presented in tabular form in Appendix B to this report. All industry data for previous years are taken directly from the X-Factor update reported in USTA's April 14, 1999 ex parte. There have been no subsequent revisions to industry data for 1995 or 1996. For 1997, only local call volume has been revised upward by four one-hundredths of one percent. It follows (as will be discussed below) that any changes in the 1995-97 X-Factors since the April 14, 1999 update derive from revisions made by the Bureau of Labor Statistics (BLS) and the Bureau of Economic Analysis (BEA) to the official U.S. data series used to form the FCC's productivity and input price differentials.

3. Data Series Taken or Produced from U.S. Government Sources

The text accompanying USTA's initial X-Factor update (Comments, October 26, 1998) describes in detail the four data series in the FCC model that are not extracted from industry sources but either are taken directly from or are constructed from data produced by the BLS or the BEA. These four series now are updated through 1998. FCC methods, as

described in the Commission's May 1997 order, are replicated. The interested reader is referred to the initial October 26, 1998 report for methodological details.

The BLS measures of total factor productivity (TFP) growth and input price growth for the U.S. nonfarm economy are used directly in the FCC model as the U.S. benchmarks against which the productivity and input price differential components of the X-Factor are computed. The BLS has updated these two series through 1997 and projects that its estimates for 1998 will not be available until early 2000. In the meantime, 1998 estimates for each series are calculated using the FCC convention (adopted in its May 1997 4th Report Order) of forming averages of the respective input price and TFP growth rates during the preceding five years. The resulting updated series are reported in columns B and E, respectively, of Chart D1 in Appendix A to this report. A comparison of the revised BLS series with their immediate predecessors is provided in the next section.

The other two government series used in the FCC model are price indexes. The "materials price index" and the "composite asset price" appear in Charts D8 and D9, respectively. (See Appendix A.) FCC sources and methods are replicated. Both price series are formed as weighted averages of disaggregated price data. In the case of the materials price index, the required 183-order prices in the BLS interindustry accounts are available through 1997. Following FCC convention, each of the 183-order prices for 1998 is estimated based on its 1997 level and its average growth rate over the preceding five years. Corresponding 183-order weights for 1998 are formed by interpolating expenditure shares for the communications industry taken from the BLS input/output tables for 1995 and 2006. For the composite asset price, the underlying three BEA asset prices described in the FCC's 1997 order are available through 1997 and are updated through 1998 using the same five-year average growth rate procedure described above for material prices. Corresponding asset-specific weights for 1998 prices are formed using RBOC data for 1998 capital additions data as directed by the FCC model. The present update of the material price index caused no change in the 1995-97 material price indexes used in the April 14, 1999 update. Revisions in the underlying asset-

specific prices and weights for 1996 and 1997 caused the BEA composite asset price in Chart D9 to decrease by 0.2% for both years relative to their values reported in the April 14, 1999 update. The effect of this change on the X-Factor is discussed in the following section.

4. The 1998 Update

The present update not only computes an X-Factor for 1998 but also incorporates all data revisions (discussed above) that have been posted for earlier years as of August 20, 1999. The following two tables provide a useful summary of the update results. Each presents the full set of seven columns found in the summary Chart D1 of the Commission's X-Factor model. Table 1 presents the 1994-97 component and X-Factor results reported in the previous USTA update submitted as an ex parte April 14, 1999. The entries in the 1994 and 1995 rows are identical to those reported in the original FCC model released May 1997. Table 2 presents the corresponding results calculated in the present 1998 update. Each table begins with 1994 because it is the most recent year unaffected by BLS or BEA data revisions.

One's attention is immediately drawn to the "X-Factor" columns in the two tables. Two important conclusions are immediately apparent. First, posted revisions to 1995-97 data have reduced the X-Factors in each year: -0.50 percentage points for 1995, -0.58 percentage points for 1996, and -0.37 percentage points for 1997. Second, the 3.03% X-Factor for 1998 not only falls below the 3.62% X-Factor for 1997 but, like its 1996 and 1997 counterparts, also is well below the X-Factors found in the initial FCC report for 1993 (3.51%), 1994 (5.47%), and 1995 (6.70%), the three years so important in the Commission's decision to peg its current policy standard at 6.5%.

Discussion focusing on the 1998 X-Factor will continue below but it is first instructive to analyze the sources of change in the 1995-97 X-Factors. A column-by-column comparison of the two tables reveals that the changes in 1995-97 X-Factors mainly derive from revisions to the BLS TFP and input price data series. The 1995 and 1996 entries in the RBOC columns A and D are identical in both tables. The 1997 column A entry decreases by only 0.01 due to a

Table 1

Update Results: April 14, 1999 (USTA Ex Parte)

Chart D1: Components of FCC LEC Price Cap X-Factor (Excluding CPD)

Year	Input Price Growth Rates			TFP Growth Rates			X-Factor
	Total RBOCs A	U.S. B	Input Price Differential C=B-A	Total RBOCs D	U.S. E	TFP Differential F=D-E	G=C+F
1994	-0.05	3.37	3.42	2.35	0.30	2.05	5.47
1995	1.23	2.61	1.38	5.11	-0.20	5.31	6.70
1996	5.94	3.00	-2.94	6.40	0.89	5.50	2.56
1997	0.90	2.86	1.96	2.59	0.58	2.01	3.97

Table 2

Update Results: August 20, 1999

Chart D1: Components of FCC LEC Price Cap X-Factor (Excluding CPD)

Year	Input Price Growth Rates			TFP Growth Rates			X-Factor
	Total RBOCs A	U.S. B	Input Price Differential C=B-A	Total RBOCs D	U.S. E	TFP Differential F=D-E	G=C+F
1994	-0.05	3.37	3.42	2.35	0.30	2.05	5.47
1995	1.23	2.61	1.38	5.11	0.30	4.82	6.20
1996	5.94	3.00	-2.94	6.40	1.48	4.92	1.98
1997	0.89	2.30	1.41	2.60	0.39	2.21	3.62
1998	3.85	2.69	-1.16	4.72	0.53	4.19	3.03

revision in the BEA composite asset price discussed above; the 1997 column D entry increases by only 0.01 due to the +0.04% revision in 1997 local call volume.

It is revisions in the BLS input price and TFP data for the U.S. nonfarm sector that are responsible for the downward revisions to the X-Factors in 1995, 1996, and 1997. A comparison of the "U.S." columns B and E across the two tables indicates that upward revisions to U.S. nonfarm TFP growth for 1995 and 1996 are solely responsible for the resulting -0.50 and -0.58 declines in the X-Factors for those years. In 1997, the BLS adjusted nonfarm TFP growth and input price growth downward by 0.19 and 0.56 percentage points, respectively, with a net -0.37 effect on the 1997 X-Factor. With its revisions to its 1995-97 series, the BLS captured the strong productivity and input price performance registered by the economy in recent years. Given the differential structure of the FCC's X-Factor model, these upward revisions to U.S. performance result in downward adjustments to the X-Factors.

Examination of the 1998 X-Factor in Chart D1 (Appendix A) begins with recognizing that its 3.03% level makes it the second lowest X-Factor in the entire price-cap era 1991-98. Moreover, like the corresponding X-Factors for 1996 and 1997, the 3.03% measure for 1998 quantitatively refutes what the Commission determined would be an increasing upward trend after the 1993-95 period.[1] In fact, the average X-Factor in the 1996-98 period is 2.88%, less than half the 6.5% X-Factor presently adopted by the Commission in its price-cap model.

A source decomposition of the 3.03% X-Factor yields some useful insights. First, on the productivity side of the ledger, labor input continues to exhibit a trend reversal (Chart D6). In contrast to consistent labor force reductions at five percent annual rates over the 1991-95 period, labor input's decline slowed in 1996 (-2.6%) and reversed direction in 1997 (0.04%). The trend reversal continued in 1998 with labor input increasing at a 0.07% annual rate. As predicted in USTA's November 9, 1998 Reply Comments, early

[1] Para 139, FCC 4th Report Order, CC Docket 94-1.

productivity gains resulting from sizable labor force reductions in the early price-cap years could not be sustained in the long run. This continuing trend reversal is a dominant source of the lower X-Factors after 1995. Second, on the input price side of the ledger, the corollary to the reversal in labor force trends reveals itself. The LECs are experiencing upward pressure in their labor compensation rates. While labor compensation per employee increased at a 3.3% annual rate between 1991 and 1995, it increased at a 4.6% rate in the 1995-98 period (Chart D6). The incremental 1.3 percentage points flow directly into the input price differential, providing an additional downward force on the X-Factor. A third insight also follows from an examination of input price trends. Relative to 1997, the material, labor, and capital input price indexes increased at 2.5% (Chart D8), 3.7% (Chart D6), and 4.99% (Chart D9) rates. Over the three year 1995-98 period, the corresponding rates of input price change averaged 2.6%, 4.6%, and 3.8%, respectively. There is no evidence supporting the IXC claim that the post-1995 X-Factors are biased downward because of a design flaw in the way that LEC earnings enter the FCC model, purportedly inflating the LECs' input price for capital and thereby driving X down. The evidence reveals that the trend in capital's input price is not unlike that for the other LEC inputs and, moreover, the increase in labor compensation rates actually exceeds that for capital in the post-1995 period. The IXCs' argument has no quantitative support in the FCC model.

5. Conclusion

The important bottom-line policy conclusion follows from an examination of the empirical history of the X-Factor during the eight-year period of price-cap regulation. The bottom panel of Chart D1 indicates that the X-Factor averaged 4.12% during the 1991-98 interval. During the more recent five-year period (the time interval commonly used by the Commission in its analysis), the X-Factor averaged 4.06%. The update of the FCC's own model provides no empirical support for the Commission's present 6.5% policy standard.

APPENDIX A

1996-1998 UPDATE OF FCC MODEL

Chart D1: Components of FCC LEC Price Cap X-Factor [Excluding CPD]

	Input Price Growth Rates			Total Factor Productivity Growth Rates			LEC
	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Total RBOCs	U.S. Nonfarm Business Sector	Differential	Price/Productivity Differential
	A	B	C=B-A	D	E	F=D-E	G=C+F
Year							
1984							
1985							
1986	5.20%	2.33%	-2.87%	2.84%	1.10%	1.74%	-1.13%
1987	0.72%	3.45%	2.73%	3.13%	-0.50%	3.63%	6.36%
1988	-1.39%	5.02%	6.41%	0.32%	0.30%	0.02%	6.42%
1989	-2.40%	2.42%	4.82%	1.90%	0.20%	1.70%	6.52%
1990	1.86%	3.31%	1.45%	6.83%	-0.70%	7.53%	8.99%
1991	-0.69%	1.77%	2.46%	2.19%	-1.41%	3.60%	6.06%
1992	2.79%	3.15%	0.36%	4.43%	1.71%	2.72%	3.08%
1993	2.47%	2.18%	-0.29%	4.00%	0.20%	3.80%	3.51%
1994	-0.05%	3.37%	3.42%	2.35%	0.30%	2.05%	5.47%
1995	1.23%	2.61%	1.38%	5.11%	0.30%	4.82%	6.20%
1996	5.94%	3.00%	-2.94%	6.40%	1.48%	4.92%	1.98%
1997	0.89%	2.30%	1.41%	2.60%	0.39%	2.21%	3.62%
1998	3.85%	2.69%	-1.16%	4.72%	0.53%	4.19%	3.03%
Averages							
[1986-94]	0.94%	3.00%	2.05%	3.11%	0.13%	2.98%	5.03%
[1986-95]	0.97%	2.96%	1.99%	3.31%	0.15%	3.16%	5.15%
[1987-95]	0.50%	3.03%	2.53%	3.36%	0.04%	3.32%	5.85%
[1988-95]	0.48%	2.98%	2.50%	3.39%	0.11%	3.28%	5.78%
[1989-95]	0.74%	2.69%	1.94%	3.83%	0.09%	3.75%	5.69%
[1990-95]	1.27%	2.73%	1.46%	4.15%	0.07%	4.09%	5.55%
[1991-95]	1.15%	2.62%	1.47%	3.62%	0.22%	3.40%	4.86%
[1986-98]	1.57%	2.89%	1.32%	3.60%	0.30%	3.30%	4.62%
[1987-98]	1.27%	2.94%	1.67%	3.67%	0.23%	3.43%	5.10%
[1988-98]	1.32%	2.89%	1.57%	3.71%	0.30%	3.41%	4.99%
[1989-98]	1.59%	2.68%	1.09%	4.05%	0.30%	3.75%	4.85%
[1990-98]	2.03%	2.71%	0.68%	4.29%	0.31%	3.98%	4.66%
[1991-98]	2.05%	2.63%	0.58%	3.98%	0.44%	3.54%	4.12%
[1992-98]	2.45%	2.76%	0.31%	4.23%	0.70%	3.53%	3.84%
[1993-98]	2.39%	2.69%	0.30%	4.20%	0.53%	3.67%	3.97%
[1994-98]	2.37%	2.79%	0.42%	4.24%	0.60%	3.64%	4.06%

Chart D2: RBOC Interstate Revenues

Year	End User A	Interstate Switched Access B	Special Access C	Total Interstate D = A + B + C
1984				
1985	$1,499,413,893	$10,906,203,190	$1,960,688,644	$14,366,305,727
1986	$2,400,475,814	$10,484,265,170	$2,574,800,716	$15,459,541,700
1987	$3,090,639,929	$9,611,996,187	$2,657,677,439	$15,360,313,555
1988	$3,604,221,000	$9,662,529,000	$2,539,698,000	$15,806,448,000
1989	$4,398,692,000	$9,092,575,000	$2,253,922,000	$15,745,189,000
1990	$4,679,142,000	$8,595,750,000	$2,209,064,000	$15,483,956,000
1991	$4,828,177,000	$8,514,130,000	$2,119,037,000	$15,461,344,000
1992	$4,963,262,000	$8,650,880,000	$2,153,565,000	$15,767,707,000
1993	$5,244,094,000	$8,999,065,000	$2,097,997,000	$16,341,156,000
1994	$5,589,662,000	$9,293,783,000	$2,217,125,000	$17,100,570,000
1995	$5,770,285,000	$9,332,869,000	$2,529,667,000	$17,632,821,000
1996	$5,930,960,000	$9,409,639,000	$3,070,598,000	$18,411,197,000
1997	$6,268,026,000	$8,763,815,000	$3,851,028,000	$18,882,869,000
1998	$7,807,872,000	$7,275,241,000	$4,815,249,000	$19,898,362,000

Chart D3: RBOC REVENUES (Excluding Miscellaneous Services)

Year	Local Service A	Intrastate Toll and Intrastate Access B	Interstate C	Total D = A + B + C
1984				
1985	$26,960,554,164	$13,047,095,682	$14,366,305,727	$54,373,955,573
1986	$28,626,174,049	$13,538,946,795	$15,459,541,700	$57,624,662,544
1987	$29,150,842,991	$14,166,723,124	$15,360,313,555	$58,677,879,670
1988	$29,226,988,000	$14,994,975,000	$15,806,448,000	$60,028,411,000
1989	$29,973,157,000	$14,868,219,000	$15,745,189,000	$60,586,565,000
1990	$30,699,085,000	$15,014,729,000	$15,483,956,000	$61,197,770,000
1991	$32,059,008,000	$14,522,276,000	$15,461,344,000	$62,042,628,000
1992	$33,359,990,000	$14,225,181,000	$15,767,707,000	$63,352,878,000
1993	$34,598,957,000	$14,496,831,000	$16,341,156,000	$65,436,944,000
1994	$35,758,637,000	$14,355,983,000	$17,100,570,000	$67,215,190,000
1995	$37,684,860,000	$13,123,225,000	$17,632,821,000	$68,440,906,000
1996	$40,523,387,000	$12,987,476,000	$18,411,197,000	$71,922,060,000
1997	$42,460,592,000	$12,308,613,000	$18,882,869,000	$73,652,074,000
1998	$44,993,354,000	$11,978,176,000	$19,898,362,000	$76,869,892,000

Chart D4: Calculation of Fisher Ideal Index for Interstate Output

	Revenue Shares			Quantities			Output Indices			Interstate	
	End User	Interstate Switched Access	Special Access	Access Lines	Switched Access Minutes	Special Access Lines	Laspeyres	Paasche	Fisher Relative	Output Quantity Index	Growth
Year							A	B	C=(A*B)^0.5		
1984											
1985	10.44%	75.92%	13.65%	92,671,959	156,853,820,000	1,230,590	1.000000	1.000000	1.000000	1.000000	
1986	15.53%	67.82%	16.66%	95,333,864	157,302,701,000	1,664,101	1.053249	1.052253	1.052751	1.052751	5.14%
1987	20.12%	62.58%	17.30%	98,228,585	173,154,171,000	1,764,445	1.083098	1.078813	1.080953	1.137975	7.78%
1988	22.80%	61.13%	16.07%	98,270,787	187,663,836,000	2,701,817	1.144443	1.114960	1.129605	1.285462	12.19%
1989	27.94%	57.75%	14.31%	101,190,050	210,406,134,000	2,448,090	1.065766	1.058920	1.062338	1.365595	6.05%
1990	30.22%	55.51%	14.27%	103,857,988	231,960,296,000	3,518,005	1.129086	1.114500	1.121769	1.531882	11.49%
1991	31.23%	55.07%	13.71%	107,383,807	246,710,182,000	5,151,699	1.111811	1.094856	1.103301	1.690127	9.83%
1992	31.48%	54.86%	13.66%	108,938,065	262,187,655,000	6,033,139	1.062516	1.060258	1.061386	1.793878	5.96%
1993	32.09%	55.07%	12.84%	112,196,681	278,173,161,000	10,153,615	1.136148	1.102619	1.119258	2.007812	11.27%
1994	32.69%	54.35%	12.97%	115,264,861	298,342,017,323	13,824,365	1.095119	1.086800	1.090952	2.190425	8.71%
1995	32.72%	52.93%	14.35%	119,887,506	334,981,582,000	16,107,677	1.101268	1.099925	1.100596	2.410774	9.59%
1996	32.21%	51.11%	16.68%	125,333,996	363,445,050,000	20,775,150	1.101412	1.100708	1.101060	2.654407	9.63%
1997	33.19%	46.41%	20.39%	131,458,355	387,587,696,669	24,479,958	1.079432	1.081360	1.080396	2.867810	7.73%
1998	39.24%	36.56%	24.20%	136,170,133	407,903,661,000	31,620,187	1.095710	1.094610	1.095160	3.140710	9.09%
										Average[1986-95]	8.80%
										Average[1986-97]	8.78%
										Average[1986-98]	8.80%

Chart D5: Calculation of Fisher Ideal Index for Total Company Output

	Revenue Shares			Quantities			Output Indices			Total	
	Local Service	Intrastate Toll and Instratate Access	Interstate	Number of Local Calls	Intrastate DEMs	Interstate Quantity Index	Laspeyres	Paasche	Fisher Relative	Company Output Index	Growth
Year	A	B	C				A	B	C=(A*B)^0.5		
1984											
1985	49.58%	24.00%	26.42%	310,696,999,600	164,191,177,000	1.000000	1.000000	1.000000	1.000000	1.000000	
1986	49.68%	23.50%	26.83%	315,839,746,231	173,173,536,000	1.052751	1.035272	1.034895	1.035083	1.035083	3.45%
1987	49.68%	24.14%	26.18%	320,735,770,416	183,597,411,000	1.137975	1.043561	1.042639	1.043100	1.079696	4.22%
1988	48.69%	24.98%	26.33%	318,724,184,964	191,904,837,000	1.285462	1.041736	1.039449	1.040592	1.123522	3.98%
1989	49.47%	24.54%	25.99%	330,212,044,704	207,298,177,000	1.365595	1.054001	1.053389	1.053695	1.183850	5.23%
1990	50.16%	24.53%	25.30%	342,403,840,684	217,913,904,000	1.531882	1.062478	1.060759	1.061618	1.256797	5.98%
1991	51.67%	23.41%	24.92%	353,219,571,000	219,713,721,000	1.690127	1.044009	1.042832	1.043420	1.311367	4.25%
1992	52.66%	22.45%	24.89%	365,468,629,000	224,278,538,000	1.793878	1.038080	1.038005	1.038042	1.361254	3.73%
1993	52.87%	22.15%	24.97%	376,995,406,000	227,540,869,000	2.007812	1.049556	1.048164	1.048860	1.427765	4.77%
1994	53.20%	21.36%	25.44%	392,601,075,000	235,362,364,000	2.190425	1.052215	1.052028	1.052121	1.502182	5.08%
1995	55.06%	19.17%	25.76%	409,383,799,000	246,926,539,000	2.410774	1.058829	1.058314	1.058572	1.590167	5.69%
1996	56.34%	18.06%	25.60%	422,262,867,000	263,719,641,000	2.654407	1.056399	1.055052	1.055725	1.678780	5.42%
1997	57.65%	16.71%	25.64%	433,316,755,000	273,526,580,000	2.867810	1.042045	1.041424	1.041734	1.748843	4.09%
1998	58.53%	15.58%	25.89%	444,538,659,000	296,776,339,000	3.140710	1.053532	1.052051	1.052791	1.841166	5.14%
									Average[1986-95]		4.64%
									Average[1986-97]		4.66%
									Average[1986-98]		4.70%

Chart D6: Labor Input Price and Growth

Year	Total Employees A	Total Compensation B	Labor Rate Annual C = B / A	Labor Price Index (Base = 1985)	Labor Growth %Chg in A
1984					
1985	504,113	16,991,572,326	33705.88	1.000000	
1986	482,698	16,728,435,454	34656.11	1.028192	-4.34%
1987	477,714	16,978,905,847	35541.99	1.054474	-1.04%
1988	466,827	17,030,359,791	36481.09	1.082336	-2.31%
1989	461,149	16,910,850,694	36671.12	1.087974	-1.22%
1990	443,105	17,586,868,921	39690.07	1.177541	-3.99%
1991	414,457	17,186,211,200	41466.81	1.230255	-6.68%
1992	411,167	17,160,988,000	41737.27	1.238279	-0.80%
1993	395,639	17,956,438,000	45385.91	1.346528	-3.85%
1994	367,196	17,154,284,000	46716.97	1.386018	-7.46%
1995	346,843	16,203,522,000	46717.17	1.386024	-5.70%
1996	338,040	16,597,889,075	49100.37	1.456730	-2.57%
1997	338,177	17,451,673,000	51605.14	1.531043	0.04%
1998	338,404	18,128,861,000	53571.65	1.589386	0.07%
				Average[1986-95]	-3.74%
				Average[1986-97]	-3.33%
				Average[1986-98]	-3.07%

Chart D7: Summary of Capital Adjustments and Average Depreciation

Year	TPIS.BOY A	Unadj. Additions B	TPIS.EOY C	Retires D=A+B-C	Adjustment Factor E	Adjusted Additions F = B * E	Adjusted EOY TPIS G = A+F-D	Depreciation Accruals H	Adjusted Depreciation Rate I=H/((A+G)/2)
1984									
1985	138,879,365	15,001,998	149,061,793	4,819,569	0.8880	13,321,774	147,381,569	10,241,376	7.155%
1986	149,061,793	14,842,725	159,010,189	4,894,328	0.8880	13,180,340	157,347,804	11,826,961	7.720%
1987	159,010,189	14,138,370	167,720,577	5,427,983	0.8880	12,554,872	166,137,079	13,311,655	8.188%
1988	168,505,114	14,284,742	175,860,216	6,929,640	1.0000	14,284,742	175,860,216	13,134,992	7.629%
1989	175,860,216	13,283,569	182,978,381	6,165,404	1.0000	13,283,569	182,978,381	13,420,810	7.480%
1990	182,978,381	14,476,334	187,168,695	10,286,020	1.0000	14,476,334	187,168,695	13,439,933	7.262%
1991	187,168,695	14,527,049	192,034,545	9,661,199	1.0000	14,527,049	192,034,545	13,200,593	6.962%
1992	192,034,545	14,611,866	196,411,915	10,234,496	1.0000	14,611,866	196,411,915	13,337,581	6.867%
1993	196,411,915	14,860,116	203,082,418	8,189,613	1.0000	14,860,116	203,082,418	14,032,782	7.025%
1994	203,082,418	14,717,999	209,325,562	8,474,855	1.0000	14,717,999	209,325,562	14,863,196	7.208%
1995	209,325,562	15,374,568	217,430,207	7,269,923	1.0000	15,374,568	217,430,207	15,358,553	7.198%
1996	217,430,207	18,026,150	227,317,120	8,139,237	1.0000	18,026,150	227,317,120	16,252,281	7.309%
1997	227,317,120	18,253,199	236,896,179	8,674,140	1.0000	18,253,199	236,896,179	16,667,034	7.181%
1998	236,896,179	18,553,791	248,970,288	6,479,681	1.0000	18,553,791	248,970,289	17,154,619	7.061%
								Average[1985-95]	7.336%
								Average[1985-97]	7.322%
								Average[1985-98]	7.303%

Chart D8: Construction of Materials Quantity Index

Year	Materials Price Index (1985=1.00) A	Operating Expense B	Depreciation & Amortization Expense C	Employee Compensation D	Materials Expense E = B - C - D	Materials Quantity Index F = E / A	Materials Quantity Index (1985 = 1.0) G	Materials Quantity Index Growth H
1984								
1985	1.000000	40,953,072,435	10,024,710,656	16,991,572,326	13,936,789,453	13,936,789,453	1.000000	
1986	1.031346	42,424,084,849	11,592,001,248	16,728,435,454	14,103,648,147	13,674,987,526	0.981215	-1.90%
1987	1.053529	44,293,127,430	13,316,999,560	16,978,905,847	13,997,222,023	13,286,033,126	0.953307	-2.89%
1988	1.086392	46,809,139,000	13,646,937,000	17,030,359,791	16,131,842,209	14,849,003,149	1.065454	11.12%
1989	1.126234	48,600,813,000	13,860,101,000	16,910,850,694	17,829,861,306	15,831,394,231	1.135943	6.41%
1990	1.172025	49,544,744,000	13,931,515,000	17,586,868,921	18,026,360,079	15,380,530,820	1.103592	-2.89%
1991	1.204935	50,901,049,000	13,499,778,000	17,186,211,200	20,215,059,800	16,776,884,245	1.203784	8.69%
1992	1.234797	50,698,625,000	13,822,882,000	17,160,988,000	19,714,755,000	15,965,992,971	1.145601	-4.95%
1993	1.255352	52,766,635,000	14,244,514,000	17,956,438,000	20,565,683,000	16,382,401,649	1.175479	2.57%
1994	1.291436	55,916,863,000	15,068,058,000	17,154,284,000	23,694,521,000	18,347,418,469	1.316474	11.33%
1995	1.321671	56,831,094,000	15,556,284,000	16,203,522,000	25,071,288,000	18,969,381,288	1.361101	3.33%
1996	1.361400	57,884,494,000	16,377,242,000	16,597,889,075	24,909,362,925	18,296,870,339	1.312847	-3.61%
1997	1.395497	59,731,175,000	16,758,832,000	17,451,673,000	25,520,670,000	18,287,867,671	1.312201	-0.05%
1998	1.430735	60,836,253,000	17,306,863,000	18,128,861,000	25,400,529,000	17,753,487,504	1.273858	-2.97%

Chart D8a: Adjustments of 1985-87 RBOC Operating Expenses for Accounting Changes

	USTA Study Operating Expense A	Nonregulated Expense Adjustmts B	Capital/Expense Shift C	Shift Factor D = (A+B+C)/A	RBOC Operating Expense E	Adjusted Operating Exp. F = D * E
1985	46,223,368,251	406,886,403	1,985,079,714	1.05175	38,938,104,053	40,953,072,435
1986	48,113,849,487	471,112,072	1,959,363,711	1.05052	40,384,079,165	42,424,084,849
1987	49,562,282,080	1,089,570,002	1,908,791,665	1.06050	41,766,392,483	44,293,127,430

Chart D9: Capital Quantity and Price Index Calculations

Year	Benchmark A	Adjusted Capital Additions B	BEA Composite Asset Price C	Capital Stock Quantity D	Capital Input Quantity E	Capital Input Quantity Growth F	Property Income /w Depreciation G	Capital Rental Price** H	Capital Rental Price Index I	Rental Price Index Growth J
1984		n/a		103,903,095						
1985	109,602,959	13,321,774	1.000000	109,602,710	1.000000		23,445,593,794	0.225648657	1.000000	
1986		13,180,340	1.010482	114,606,056	1.054855	0.053403	26,792,578,943	0.244451792	1.083329	8.00%
1987		12,554,872	1.027339	118,419,511	1.103009	0.044639	27,701,751,800	0.241712809	1.071191	-1.13%
1988		14,284,742	1.030466	123,594,868	1.139711	0.032733	26,866,209,000	0.226873162	1.005427	-6.34%
1989		13,283,569	1.070178	126,940,642	1.189521	0.042776	25,845,853,000	0.209117526	0.926740	-8.15%
1990		14,476,334	1.089729	130,912,833	1.221721	0.026711	25,584,541,000	0.201547279	0.893191	-3.69%
1991		14,527,049	1.102220	134,489,094	1.259951	0.030812	24,641,357,000	0.188227208	0.834161	-6.84%
1992		14,611,866	1.108304	137,807,183	1.294370	0.026951	26,477,135,000	0.196871985	0.872471	4.49%
1993		14,860,116	1.112312	141,057,540	1.326305	0.024372	26,914,823,000	0.195307838	0.865540	-0.80%
1994		14,717,999	1.117639	143,878,628	1.357587	0.023312	26,366,385,000	0.18691936	0.828365	-4.39%
1995		15,374,568	1.114809	147,115,146	1.384739	0.019802	27,166,096,000	0.188812588	0.836755	1.01%
1996		18,026,150	1.118623	152,437,614	1.415888	0.022246	30,414,808,000	0.206741514	0.916210	9.07%
1997		18,253,199	1.117644	157,586,899	1.467113	0.035540	30,679,731,000	0.201260897	0.891922	-2.69%
1998		18,553,791	1.117690	162,626,701	1.516672	0.033222	33,340,502,000	0.211568996	0.937604	4.99%

Chart D10: Factor Shares of Total Payments

Year	Labor Compensation	Materials Payment	Property Income /w Depreciation	Total Factor Payment	Labor Compensation Share	Materials Payment Share	Property Income /w Depreciation Share
1984							
1985	16,991,572,326	13,936,789,453	23,445,593,794	54,373,955,573	31.25%	25.63%	43.12%
1986	16,728,435,454	14,103,648,147	26,792,578,943	57,624,662,544	29.03%	24.48%	46.49%
1987	16,978,905,847	13,997,222,023	27,701,751,800	58,677,879,670	28.94%	23.85%	47.21%
1988	17,030,359,791	16,131,842,209	26,866,209,000	60,028,411,000	28.37%	26.87%	44.76%
1989	16,910,850,694	17,829,861,306	25,845,853,000	60,586,565,000	27.91%	29.43%	42.66%
1990	17,586,868,921	18,026,360,079	25,584,541,000	61,197,770,000	28.74%	29.46%	41.81%
1991	17,186,211,200	20,215,059,800	24,641,357,000	62,042,628,000	27.70%	32.58%	39.72%
1992	17,160,988,000	19,714,755,000	26,477,135,000	63,352,878,000	27.09%	31.12%	41.79%
1993	17,956,438,000	20,565,683,000	26,914,823,000	65,436,944,000	27.44%	31.43%	41.13%
1994	17,154,284,000	23,694,521,000	26,366,385,000	67,215,190,000	25.52%	35.25%	39.23%
1995	16,203,522,000	25,071,288,000	27,166,096,000	68,440,906,000	23.68%	36.63%	39.69%
1996	16,597,889,075	24,909,362,925	30,414,808,000	71,922,060,000	23.08%	34.63%	42.29%
1997	17,451,673,000	25,520,670,000	30,679,731,000	73,652,074,000	23.69%	34.65%	41.65%
1998	18,128,861,000	25,400,529,000	33,340,502,000	76,869,892,000	23.58%	33.04%	43.37%

Chart D11: Input Quantity Index

	Shares			Quantities			Quantity Indices				
	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres	Paasche	Fisher Relative	Fisher Chain	Growth
							A	B	C=(A*B)^0.5		
Year											
1984											
1985	31.25%	25.63%	43.12%	504,113	13,936,789,453	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	482,698	13,674,987,526	1.05486	0.96820	0.96822	1.00611	1.00611	0.61%
1987	28.94%	23.85%	47.21%	477,714	13,286,033,126	1.10301	0.98139	0.98140	1.01099	1.01717	1.09%
1988	28.37%	26.87%	44.76%	466,827	14,849,003,149	1.13971	1.04067	1.04083	1.03731	1.05512	3.66%
1989	27.91%	29.43%	42.66%	461,149	15,831,394,231	1.18952	1.02594	1.02654	1.03384	1.09082	3.33%
1990	28.74%	29.46%	41.81%	443,105	15,380,530,820	1.22172	0.96634	0.96623	0.99151	1.08156	-0.85%
1991	27.70%	32.58%	39.72%	414,457	16,776,884,245	1.25995	1.01403	1.01340	1.02084	1.10410	2.06%
1992	27.09%	31.12%	41.79%	411,167	15,965,992,971	1.29437	0.97023	0.97005	0.99305	1.09642	-0.70%
1993	27.44%	31.43%	41.13%	395,639	16,382,401,649	1.32630	0.99637	0.99530	1.00769	1.10484	0.77%
1994	25.52%	35.25%	39.23%	367,196	18,347,418,469	1.35759	1.03052	1.03050	1.02772	1.13547	2.73%
1995	23.68%	36.63%	39.69%	346,843	18,969,381,288	1.38474	0.99639	0.99689	1.00579	1.14205	0.58%
1996	23.08%	34.63%	42.29%	338,040	18,296,870,339	1.41589	0.96850	0.96855	0.99029	1.13096	-0.98%
1997	23.69%	34.65%	41.65%	338,177	18,287,867,671	1.46711	0.99987	0.99987	1.01495	1.14787	1.48%
1998	23.58%	33.04%	43.37%	338,404	17,753,487,504	1.51667	0.98292	0.98301	1.00425	1.15276	0.42%

Chart D12: Input Price Index

	Shares			Prices			Price Indices				
	Labor Compensation	Materials Payment	Property Income /w Depreciation	Labor	Materials	Capital	Laspeyres A	Paasche B	Fisher Relative C=(A*B)^0.5	Fisher Chain	Growth
Year											
1984											
1985	31.25%	25.63%	43.12%	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	
1986	29.03%	24.48%	46.49%	1.02819	1.03135	1.08333	1.06395	1.06482	1.05335	1.05335	5.20%
1987	28.94%	23.85%	47.21%	1.05447	1.05353	1.07119	1.00008	0.99954	1.00720	1.06094	0.72%
1988	28.37%	26.87%	44.76%	1.08234	1.08639	1.00543	0.96969	0.97133	0.98622	1.04632	-1.39%
1989	27.91%	29.43%	42.66%	1.08797	1.12623	0.92674	0.96486	0.96543	0.97626	1.02148	-2.40%
1990	28.74%	29.46%	41.81%	1.17754	1.17202	0.89319	0.99518	0.99415	1.01874	1.04063	1.86%
1991	27.70%	32.58%	39.72%	1.23025	1.20494	0.83416	0.97284	0.97412	0.99311	1.03346	-0.69%
1992	27.09%	31.12%	41.79%	1.23828	1.23480	0.87247	1.03640	1.03680	1.02827	1.06267	2.79%
1993	27.44%	31.43%	41.13%	1.34653	1.25535	0.86554	1.00255	1.00256	1.02502	1.08926	2.47%
1994	25.52%	35.25%	39.23%	1.38602	1.29144	0.82836	0.98810	0.98970	0.99947	1.08868	-0.05%
1995	23.68%	36.63%	39.69%	1.38602	1.32167	0.83675	1.01642	1.01646	1.01237	1.10215	1.23%
1996	23.08%	34.63%	42.29%	1.45673	1.36140	0.91621	1.06381	1.06475	1.06116	1.16956	5.94%
1997	23.69%	34.65%	41.65%	1.53104	1.39550	0.89192	0.99670	0.99624	1.00897	1.18005	0.89%
1998	23.58%	33.04%	43.37%	1.58939	1.43073	0.93760	1.03943	1.03983	1.03927	1.22639	3.85%

APPENDIX B

INDUSTRY DATA

USTA Attachment B

August, 1999

FCC STAFF'S TFP PRODUCTIVITY MODEL
(4th Report & Order, May 21, 1997, CC Docket 94 -1)
USTA's UPDATE for 1998

(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D2, D3	FCC Model Data 1998	
Inter. End User Revenue	$7,807,872	
S.O.C.C., Table 2.9, line 154	24.6%	<- Annual change
Inter Switched Access	$7,275,241	
S.O.C.C., Table 2.9, line 155	-17.0%	
Inter Special Access	$4,815,249	
S.O.C.C., Table 2.9, line 156	25.0%	
TOTAL INTERSTATE REVS	$19,898,362	
	5.4%	
Local Service Revenue	$44,993,354	
S.O.C.C., Table 2.9, line 153	6.0%	
Intra. Toll & Access	$11,978,176	
S.O.C.C., Table 2.9, l 157+174	-2.7%	
TOTAL INTRASTATE REVS	$56,971,530	
	4.0%	
GRAND TOT REVS (-MISC)	$76,869,892	
	4.4%	

S.O.C.C. for 1998 refers to the FCC's "Preliminary Statistics of Communications Common Carrier dated May 28, 1999

FCC STAFF'S TFP PRODUCTIVITY MODEL
(4th Report & Order, May 21, 1997, CC Docket 94 -1)
USTA's UPDATE for 1998

(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D4, D5	FCC Model Data 1998	
Switched Acc Line -Mobile	136,170,133	
SOCC Table 2.10	3.6%	<- Annual change
Switched Acc Minutes	407,903,661	<-- Projection prior to Joint Board reporting
SOCC Table 2.10	*404,681,553*	<-- ADD 1,865,240 for Bell Atl. - North revision
	5.2%	
Special Acc Lines Dig+Anlog	31,620,187	<-- ADD 52,416 for SBC - Nevada revision, also
SOCC Table 2.10	29.2%	DECREASE 2,583,895 for Bell Atl. - North revisi
Local Call Volume	444,538,659	<-- DECREASE 9,796,480 for Pacific, NV revisi
SOCC Table 2.10	2.6%	
Intrastate DEMs	296,776,339	<-- Projection prior to Joint Board reporting
	8.5%	
FCC CHART D6		
Total Employees	338,404	
Stat of C. C. Table 2.9, line 321	0.1%	
Total Compensation $000	$18,128,861	<-- ADD $207,702 for US West revision
Stat of C. C. Table 2.9, line 324	3.9%	

FCC STAFF'S TFP PRODUCTIVITY MODEL
(4th Report & Order, May 21, 1997, CC Docket 94 -1)
USTA's UPDATE for 1998
(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D7	FCC Model Data 1998	
TPIS - BOY	$236,896,179	
SOCC, Tab 2.7 (Ac260-2111)	4.2%	<- Annual change
Unadj. Additions	$18,553,791	
SOCC, Tab 2.7 (Ac260-2111)	1.6%	
TPIS - EOY	$248,970,288	
SOCC, Tab 2.7 (Ac260-2111)	5.1%	
Retires = BOY+Adds-EOY	$6,479,681	<-- *calc*
Depreciation Accruals	$17,154,619	
SOCC Tabl 2.9, l 250+252	2.9%	

FCC STAFF'S TFP PRODUCTIVITY MODEL
(4th Report & Order, May 21, 1997, CC Docket 94 -1)
USTA's UPDATE for 1998

(FCC SOCC 1998 BOC Data Tables adjusted for SNET merger for consistency)

FCC CHART D8	**FCC Model Data 1998**	
Operating Expense	$60,836,253	
SOCC Tabl 2.9, line 280	1.9%	<- Annual change
Depreciation & Amortiz.	$17,306,863	
SOCC Tabl 2.9, line 255	3.3%	
Employee Compensation	$18,128,861	<-- same value as on Chart D6
Stat of C. C. Table 2.9, line 324	3.9%	
Materials = Op.Exps.-Deprec.-Compens.	$25,400,529	<-- *calc*
	-0.5%	